

GRADE 4 SCIENCE

The distinguished science student, when compared to age appropriate goals and standards, is considered to be ‘above grade level’ in terms of engaging in scientific activity and learning. The words ‘extensive’ and ‘sophisticated’ are used often as descriptors for this level. Extensive should be understood as the student provides fully developed responses which include supporting, relevant details that are accurate and appropriate, vocabulary and concepts from the discipline are used, and connections to the real world, across disciplines or within the discipline, are made.

‘Sophisticated’ implies that the student’s work reflects maturity above grade level, and responses, which are complex, supported by elaborate details.

The proficient science student, when compared to age appropriate goals and standards, is considered to be ‘on target’ in terms of engaging in scientific activity and learning. The word ‘appropriate’ is used often as a descriptor for this level. When it is used, it suggests that the student provides responses that include support/justification, relevant details, and that demonstrate an understanding of concepts and vocabulary. Occasional inaccuracies, which do not interfere with conceptual understanding, may be present.

The apprentice science student, when compared to age appropriate goals and standards, is considered to be ‘developing’ in terms of engaging in scientific activity and learning. The word ‘basic’ is used often as a descriptor for this level. When it is used, it is intended to suggest that the student provides partial responses or responses, which are limited in either accuracy or explanation, and which demonstrate limited understanding of the vocabulary and concepts of the discipline.

The novice science student, when compared to age appropriate goals and standards, is considered to be more of a ‘beginner’ in terms of engaging in scientific activity and learning. The word ‘minimal’ is used often as a descriptor for this level. When it is used, it is intended to suggest that the student demonstrates little understanding of concepts and vocabulary, and that responses include inaccuracies/misconceptions and/or little explanation. The following describe science performance:

| | DISTINGUISHED | PROFICIENT | APPRENTICE | NOVICE |
|-----------------------|---|---|---|---|
| <u>Content</u> | Student demonstrates <i>extensive</i> knowledge of science content as outlined in the core content (i.e., Properties of Objects and Materials; Position and Motion of Objects; Light, Heat, Electricity, and Magnetism; Properties of Earth Materials; Objects in the Sky; Changes in Earth and Sky; The Characteristics of Organisms; Life Cycles of Organisms; Organisms and Their Environments). | Student demonstrates <i>appropriate</i> knowledge of science content as outlined in the core content (i.e., Properties of Objects and Materials; Position and Motion of Objects; Light, Heat, Electricity, and Magnetism; Properties of Earth Materials; Objects in the Sky; Changes in Earth and Sky; The Characteristics of Organisms; Life Cycles of Organisms; Organisms and Their Environments). | Student demonstrates <i>basic</i> knowledge of science content as outlined in the core content (i.e., Properties of Objects and Materials; Position and Motion of Objects; Light, Heat, Electricity, and Magnetism; Properties of Earth Materials; Objects in the Sky; Changes in Earth and Sky; The Characteristics of Organisms; Life Cycles of Organisms; Organisms and Their Environments). | Student demonstrates <i>minimal</i> knowledge of science content as outlined in the core content (i.e., Properties of Objects and Materials; Position and Motion of Objects; Light, Heat, Electricity, and Magnetism; Properties of Earth Materials; Objects in the Sky; Changes in Earth and Sky; The Characteristics of Organisms; Life Cycles of Organisms; Organisms and Their Environments). |

| | DISTINGUISHED | PROFICIENT | APPRENTICE | NOVICE |
|---------------------------------|---|---|--|---|
| <u>Process/Inquiry</u> | Student demonstrates <i>sophisticated</i> application of appropriate science process/inquiry skills (i.e., question, observe, use simple equipment and skills, predict, use evidence to develop reasonable explanations, design and conduct simple scientific investigations, review other students' investigations and explanations) to solve problems and /or address issues related to Science and Technology, Science in Personal and Social Perspectives, and History and Nature of Science. | Student demonstrates application of appropriate science process/inquiry skills (i.e., question, observe, use simple equipment and skills, use evidence to develop reasonable explanations, design and conduct simple scientific investigations, review other students' investigations and explanations) to solve problems and /or address issues related to Science and Technology, Science in Personal and Social Perspectives, and History and Nature of Science. | Student demonstrates application of some appropriate science process/inquiry skills (i.e., question, observe, use simple equipment and skills, use evidence to develop reasonable explanations, design and conduct simple scientific investigations, review other students' investigations and explanations) to solve problems and /or address issues related to Science and Technology, Science in Personal and Social Perspectives, and History and Nature of Science. | Student demonstrates ineffective application of appropriate science process/inquiry skills (i.e., question, observe, use simple equipment and skills, use evidence to develop reasonable explanations, design and conduct simple scientific investigations, review other students' investigations and explanations) to solve problems and /or address issues related to Science and Technology, Science in Personal and Social Perspectives, and History and Nature of Science. |
| <u>Themes/Concepts</u> | Student demonstrates <i>extensive</i> understanding of unifying science themes/concepts (i.e., Patterns, Systems, Scale and Models, Constancy, and Change Over Time). | Student demonstrates <i>appropriate</i> understanding of unifying science themes/concepts (i.e., Patterns, Systems, Scale and Models, Constancy, and Change Over Time). | Student demonstrates <i>basic</i> , sometimes fragmented, understanding of unifying science themes/concepts (i.e., Patterns, Systems, Scale and Models, Constancy, and Change Over Time). | Student demonstrates <i>minimal</i> understanding of unifying science themes/concepts (i.e., Patterns, Systems, Scale and Models, Constancy, and Change Over Time). |
| <u>Communication</u> | Student demonstrates <i>sophisticated</i> communication skills by organizing information; representing data in several ways (e.g., graphs, drawings, tables, words); communicating (e.g., draw, graph, write) designs, procedures, observations, and results of scientific investigations; using evidence to support conclusions; using appropriate vocabulary; and communicating in a form suited to the purpose and audience. | Student demonstrates <i>appropriate</i> communication skills by organizing information; representing data in more than one way (e.g., graphs, drawings, tables, words); communicating designs, procedures, observations, and results of scientific investigations; using evidence to support conclusions, using appropriate vocabulary; and communicating in a form suited to the purpose and audience. | Student demonstrates <i>basic</i> communication skills (e.g., information organization; representation of data; communication of designs, procedures, observations, and results of investigations; supporting with evidence, using appropriate vocabulary; and addressing purpose and audience). | Student demonstrates ineffective communication skills. Lacks skill in organizing information; representing data (e.g., graphs, drawings, tables, words); communicating designs, procedures, observations, and results of scientific investigations; using evidence to support conclusions; using appropriate vocabulary; and communicating in a form suited to the purpose and audience. |
| <u>Critical Thinking</u> | Student consistently demonstrates use of critical thinking skills (e.g., compares, contrasts, classifies, analyzes errors, synthesizes, summarizes, uses analogies). | Student demonstrates <i>appropriate</i> use of critical thinking skills (e.g., compares, contrasts, classifies, analyzes errors, synthesizes, summarizes, uses analogies). | Student demonstrates <i>basic</i> use of critical thinking skills (e.g., compares, contrasts, classifies, analyzes errors, synthesizes, summarizes, uses analogies). | Student demonstrates <i>minimal</i> use of critical thinking skills (e.g., compares, contrasts, classifies, analyzes errors, synthesizes, summarizes, uses analogies). |

GRADE 7 SCIENCE

A paper and pencil test cannot assess important science skills such as gathering data, designing and conducting experiments, and using scientific equipment. These descriptors relate to what can be assessed.

The distinguished science student, when compared to age appropriate goals and standards, is considered to be ‘above grade level’ in terms of engaging in scientific activity and learning. The words ‘extensive’ and ‘sophisticated’ are used often as descriptors for this level. Extensive should be understood as the student provides fully developed responses which include supporting, relevant details that are accurate and appropriate, vocabulary and concepts from the discipline are used, and connections to the real world, across disciplines or within the discipline, are made. ‘Sophisticated’ implies that the student’s work reflects maturity above grade level, and responses, which are complex, supported by elaborate details.

The proficient science student, when compared to age appropriate goals and standards, is considered to be ‘on target’ in terms of engaging in scientific activity and learning. The word ‘appropriate’ is used often as a descriptor for this level. When it is used, it suggests that the student provides responses that include support/justification, relevant details, and that demonstrate an understanding of concepts and vocabulary. Occasional inaccuracies, which do not interfere with conceptual understanding, may be present.

The apprentice science student, when compared to age appropriate goals and standards, is considered to be ‘developing’ in terms of engaging in scientific activity and learning. The word ‘basic’ is used often as a descriptor for this level. When it is used, it is intended to suggest that the student provides partial responses or responses which are limited in either accuracy or explanation, and which demonstrate limited understanding of the vocabulary and concepts of the discipline.

The novice science student, when compared to age appropriate goals and standards, is considered to be more of a ‘beginner’ in terms of engaging in scientific activity and learning. The word ‘minimal’ is used often as a descriptor for this level. When it is used, it is intended to suggest that the student demonstrates little understanding of concepts and vocabulary, and that responses include inaccuracies/misconceptions and/or little explanation. The following describe science performance:

| | DISTINGUISHED | PROFICIENT | APPRENTICE | NOVICE |
|-----------------------|--|---|--|--|
| <u>Content</u> | Student demonstrates <i>extensive</i> knowledge of science content as outlined in the core content (i.e., Properties and Changes of Properties in Matter; Motion and Forces; Transfer of Energy; Structure of the Earth System: Lithosphere, Hydrosphere, Atmosphere; Earth’s History; Earth in the Solar System; Structure and Function in Living Systems; Regulation and Behavior; Reproduction and Heredity; Diversity and Adaptations of Organisms; Populations and Ecosystems). | Student demonstrates appropriate knowledge of science content as outlined in the core content (i.e., Properties and Changes of Properties in Matter; Motion and Forces; Transfer of Energy; Structure of the Earth System: Lithosphere, Hydrosphere, Atmosphere; Earth’s History; Earth in the Solar System; Structure and Function in Living Systems; Regulation and Behavior; Reproduction and Heredity; Diversity and Adaptations of Organisms; Populations and Ecosystems). | Student demonstrates <i>basic</i> knowledge of science content as outlined in the core content (i.e., Properties and Changes of Properties in Matter; Motion and Forces; Transfer of Energy; Structure of the Earth System: Lithosphere, Hydrosphere, Atmosphere; Earth’s History; Earth in the Solar System; Structure and Function in Living Systems; Regulation and Behavior; Reproduction and Heredity; Diversity and Adaptations of Organisms; Populations and Ecosystems). | Student demonstrates <i>minimal</i> knowledge of science content as outlined in the core content (i.e., Properties and Changes of Properties in Matter; Motion and Forces; Transfer of Energy; Structure of the Earth System: Lithosphere, Hydrosphere, Atmosphere; Earth’s History; Earth in the Solar System; Structure and Function in Living Systems; Regulation and Behavior; Reproduction and Heredity; Diversity and Adaptations of Organisms; Populations and Ecosystems). |

| | DISTINGUISHED | PROFICIENT | APPRENTICE | NOVICE |
|---------------------------------|---|---|---|---|
| <u>Process/Inquiry</u> | Student demonstrates sophisticated application of appropriate science process/inquiry skills (i.e., refines and refocuses questions, uses appropriate equipment, tools, techniques, technology, and mathematics to gather, analyze, and interpret scientific data, uses evidence to develop scientific explanations, designs and conducts scientific investigations, reviews and analyzes others' investigations) to solve problems and /or address issues related to Science and Technology, Science in Personal and Social Perspectives, and History and Nature of Science. | Student demonstrates application of appropriate science process/inquiry skills (i.e., refines and refocuses questions, uses appropriate equipment, tools, techniques, technology, and mathematics to gather, analyze, and interpret scientific data, uses evidence to develop scientific explanations, designs and conducts scientific investigations, reviews and analyzes others' investigations) to solve problems and /or address issues related to Science and Technology, Science in Personal and Social Perspectives, and History and Nature of Science. | Student demonstrates application of some <i>appropriate</i> science process/inquiry skills (i.e., refines and refocuses questions, uses appropriate equipment, tools, techniques, technology, and mathematics to gather, analyze, and interpret scientific data, uses evidence to develop scientific explanations, designs and conducts scientific investigations, reviews and analyzes others' investigations) to solve problems and /or address issues related to Science and Technology, Science in Personal and Social Perspectives, and History and Nature of Science. | Student demonstrates ineffective application of appropriate science process/inquiry skills (i.e., refines and refocuses questions, uses appropriate equipment, tools, techniques, technology, and mathematics to gather, analyze, and interpret scientific data, uses evidence to develop scientific explanations, designs and conducts scientific investigations, reviews and analyzes others' investigations) to solve problems and /or address issues related to Science and Technology, Science in Personal and Social Perspectives, and History and Nature of Science. |
| <u>Themes/Concepts</u> | Student demonstrates <i>extensive</i> understanding of unifying science themes/concepts (i.e., Patterns, Systems, Scale and Models, Constancy, and Change Over Time). | Student demonstrates <i>appropriate</i> understanding of unifying science themes/concepts (i.e., Patterns, Systems, Scale and Models, Constancy, and Change Over Time). | Student demonstrates <i>basic</i> , sometimes fragmented, understanding of unifying science themes/concepts (i.e., Patterns, Systems, Scale and Models, Constancy, and Change Over Time). | Student demonstrates <i>minimal</i> understanding of unifying science themes/concepts (i.e., Patterns, Systems, Scale and Models, Constancy, and Change Over Time). |
| <u>Communication</u> | Student demonstrates <i>sophisticated</i> communication skills by organizing information; representing data in several ways (e.g., graphs, drawings, tables, words); communicating (e.g., draw, graph, write) designs, procedures, observations, and results of scientific investigations; using evidence to support conclusions; using appropriate vocabulary; and communicating in a form suited to the purpose and audience. | Student demonstrates <i>appropriate</i> communication skills by organizing information; representing data in more than one way (e.g., graphs, drawings, tables, words); communicating designs, procedures, observations, and results of scientific investigations; using evidence to support conclusions; using appropriate vocabulary; and communicating in a form suited to the purpose and audience. | Student demonstrates <i>basic</i> communication skills (e.g., information organization; representation of data; communication of designs, procedures, observations, and results of investigations; supporting with evidence; using appropriate vocabulary; and addressing purpose and audience). | Student demonstrates <i>ineffective</i> communication skills. Lacks skill in organizing information; representing data (e.g., graphs, drawings, tables, words); communicating designs, procedures, observations, and results of scientific investigations; using evidence to support conclusions; using appropriate vocabulary; and communicating in a form suited to the purpose and audience. |
| <u>Critical Thinking</u> | Student consistently demonstrates use of critical thinking skills (e.g., analyzes perspectives, uses inductive and deductive reasoning, and creates metaphors). | Student demonstrates <i>appropriate</i> use of critical thinking skills (e.g., analyzes perspectives, uses inductive and deductive reasoning, and creates metaphors). | Student demonstrates <i>basic</i> use of critical thinking skills (e.g., analyzes perspectives, uses inductive and deductive reasoning, and creates metaphors). | Student demonstrates <i>minimal</i> use of critical thinking skills (e.g., analyzes perspectives, uses inductive and deductive reasoning, and creates metaphors). |

GRADE 11 SCIENCE

The distinguished science student, when compared to age appropriate goals and standards, is considered to be ‘above grade level’ in terms of engaging in scientific activity and learning. The words ‘extensive’ and ‘sophisticated’ are used often as descriptors for this level. Extensive should be understood as the student provides fully developed responses which include supporting, relevant details that are accurate and appropriate, vocabulary and concepts from the discipline are used, and connections to the real world, across disciplines or within the discipline, are made. ‘Sophisticated’ implies that the student’s work reflects maturity above grade level, and responses, which are complex, supported by elaborate details.

The proficient science student, when compared to age appropriate goals and standards, is considered to be ‘on target’ in terms of engaging in scientific activity and learning. The word ‘appropriate’ is used often as a descriptor for this level. When it is used, it suggests that the student provides responses that include support/justification, relevant details, and which demonstrate an understanding of concepts and vocabulary. Occasional inaccuracies, which do not interfere with conceptual understanding, may be present.

The apprentice science student, when compared to age appropriate goals and standards, is considered to be ‘developing’ in terms of engaging in scientific activity and learning. The word ‘basic’ is used often as a descriptor for this level. When it is used, it is intended to suggest that the student provides partial responses or responses which are limited in either accuracy or explanation, and which demonstrate limited understanding of the vocabulary and concepts of the discipline.

The novice science student, when compared to age appropriate goals and standards, is considered to be more of a ‘beginner’ in terms of engaging in scientific activity and learning. The word ‘minimal’ is used often as a descriptor for this level. When it is used, it is intended to suggest that the student demonstrates little understanding of concepts and vocabulary, and that responses include inaccuracies/misconceptions and/or little explanation. The following describe science performance:

| | DISTINGUISHED | PROFICIENT | APPRENTICE | NOVICE |
|-----------------------|--|---|---|---|
| <u>Content</u> | Student demonstrates <i>extensive</i> knowledge of science content as outlined in the core content (i.e., Structure of Atoms; Structure and Properties of Matter; Chemical Reactions; Motions and Forces; Conservation of Energy and Increase in Disorder; Inter-actions of Energy and Matter; Energy in the Earth System; Geochemical Cycles; The Formation and Ongoing Changes of the Earth System; The Formation and Ongoing Changes of the Universe; The Cell; The Behavior of Organisms; The Molecular Basis of Heredity; Biological Change; The Interdependence of Organisms; Matter, Energy, and Organization in Living Systems). | Student demonstrates <i>appropriate</i> knowledge of science content as outlined in the core content (i.e., Structure of Atoms; Structure and Properties of Matter; Chemical Reactions; Motions and Forces; Conservation of Energy and Increase in Disorder; Interactions of Energy and Matter; Energy in the Earth System; Geochemical Cycles; The Formation and Ongoing Changes of the Earth System; The Formation and Ongoing Changes of the Universe; The Cell; The Behavior of Organisms; The Molecular Basis of Heredity; Biological Change; The Interdependence of Organisms; Matter, Energy, and Organization in Living Systems). | Student demonstrates <i>basic</i> knowledge of science content as outlined in the core content (i.e., Structure of Atoms; Structure and Properties of Matter; Chemical Reactions; Motions and Forces; Conservation of Energy and Increase in Disorder; Interactions of Energy and Matter; Energy in the Earth System; Geochemical Cycles; The Formation and Ongoing Changes of the Earth System; The Formation and Ongoing Changes of the Universe; The Cell; The Behavior of Organisms; The Molecular Basis of Heredity; Biological Change; The Interdependence of Organisms; Matter, Energy, and Organization in Living Systems). | Student demonstrates <i>minimal</i> knowledge of science content as outlined in the core content (i.e., Structure of Atoms; Structure and Properties of Matter; Chemical Reactions; Motions and Forces; Conservation of Energy and Increase in Disorder; Interactions of Energy and Matter; Energy in the Earth System; Geochemical Cycles; The Formation and Ongoing Changes of the Earth System; The Formation and Ongoing Changes of the Universe; The Cell; The Behavior of Organisms; The Molecular Basis of Heredity; Biological Change; The Interdependence of Organisms; Matter, Energy, and Organization in Living Systems). |

| | DISTINGUISHED | PROFICIENT | APPRENTICE | NOVICE |
|---------------------------------|--|--|---|--|
| <u>Process/Inquiry</u> | Student demonstrates <i>sophisticated</i> application of appropriate science process/inquiry skills (i.e., refines and refocuses questions, uses appropriate equipment, tools, techniques, technology, and mathematics to gather, analyze, and interpret scientific data, uses evidence to develop scientific explanations, designs and conducts scientific investigations, reviews and analyzes others' investigations, formulates testable hypotheses) to solve problems and/or address issues related to Science and Technology, Science in Personal and Social Perspectives, and History and Nature of Science | Student demonstrates application of appropriate science process/inquiry skills (i.e., refines and refocuses questions, uses appropriate equipment, tools, techniques, technology, and mathematics to gather, analyze, and interpret scientific data, uses evidence to develop scientific explanations, designs and conducts scientific investigations, reviews and analyzes others' investigations, formulates testable hypotheses) to solve problems and/or address issues related to Science and Technology, Science in Personal and Social Perspectives, and History and Nature of Science. | Student demonstrates application of some appropriate science process/inquiry skills (i.e., refines and refocuses questions, uses appropriate equipment, tools, techniques, technology, and mathematics to gather, analyze, and interpret scientific data, uses evidence to develop scientific explanations, designs and conducts scientific investigations, reviews and analyzes others' investigations, formulates testable hypotheses) to solve problems and/or address issues related to Science and Technology, Science in Personal and Social Perspectives, and History and Nature of Science. | Student demonstrates ineffective application of appropriate science process/inquiry skills (i.e., refines and refocuses questions, uses appropriate equipment, tools, techniques, technology, and mathematics to gather, analyze, and interpret scientific data, uses evidence to develop scientific explanations, designs and conducts scientific investigations, reviews and analyzes others' investigations, formulates testable hypotheses) to solve problems and/or address issues related to Science and Technology, Science in Personal and Social Perspectives, and History and Nature of Science. |
| <u>Themes/Concepts</u> | Student demonstrates <i>extensive</i> understanding of unifying science themes/concepts (i.e., Patterns, Systems, Scale and Models, Constancy, and Change Over Time). | Student demonstrates <i>appropriate</i> understanding of unifying science themes/concepts (i.e., Patterns, Systems, Scale and Models, Constancy, and Change Over Time). | Student demonstrates <i>basic</i> sometimes fragmented, understanding of unifying science themes/ concepts (i.e., Patterns, Systems, Scale and Models, Constancy, and Change Over Time). | Student demonstrates <i>minimal</i> understanding of unifying science themes/concepts (i.e., Patterns, Systems, Scale and Models, Constancy, and Change Over Time). |
| <u>Communication</u> | Student demonstrates <i>sophisticated</i> communication skills by organizing information; representing data in several ways (e.g., graphs, drawings, tables, words); communicating (e.g., draw, graph, write) designs, procedures, observations, and results of scientific investigations; using evidence to support conclusions; using appropriate vocabulary; and communicating in a form suited to the purpose and audience. | Student demonstrates <i>appropriate</i> communication skills by organizing information; representing data in more than one way (e.g., graphs, drawings, tables, words); communicating designs, procedures, observations, and results of scientific investigations; using evidence to support conclusions; using appropriate vocabulary; and communicating in a form suited to the purpose and audience. | Student demonstrates <i>basic</i> communication skills (e.g., information organization; representation of data; communication of designs, procedures, observations, and results of investigations; supporting with evidence; using appropriate vocabulary; and addressing purpose and audience). | Student demonstrates ineffective communication skills. Lacks skill in organizing information; representing data (e.g., graphs, drawings, tables, words); communicating designs, procedures, observations, and results of scientific investigations; using evidence to support conclusions; using appropriate vocabulary; and communicating in a form suited to the purpose and audience. |
| <u>Critical Thinking</u> | Student consistently demonstrates use of critical thinking skills (e.g., evaluates, synthesizes, applies, generalizes, debates). | Student demonstrates <i>appropriate</i> use of critical thinking skills (e.g., evaluates, synthesizes, applies, generalizes, debates). | Student demonstrates <i>basic</i> use of critical thinking skills (e.g., evaluates, synthesizes, applies, generalizes, debates). | Student demonstrates <i>minimal</i> use of critical thinking skills (e.g., evaluates, synthesizes, applies, generalizes, debates). |